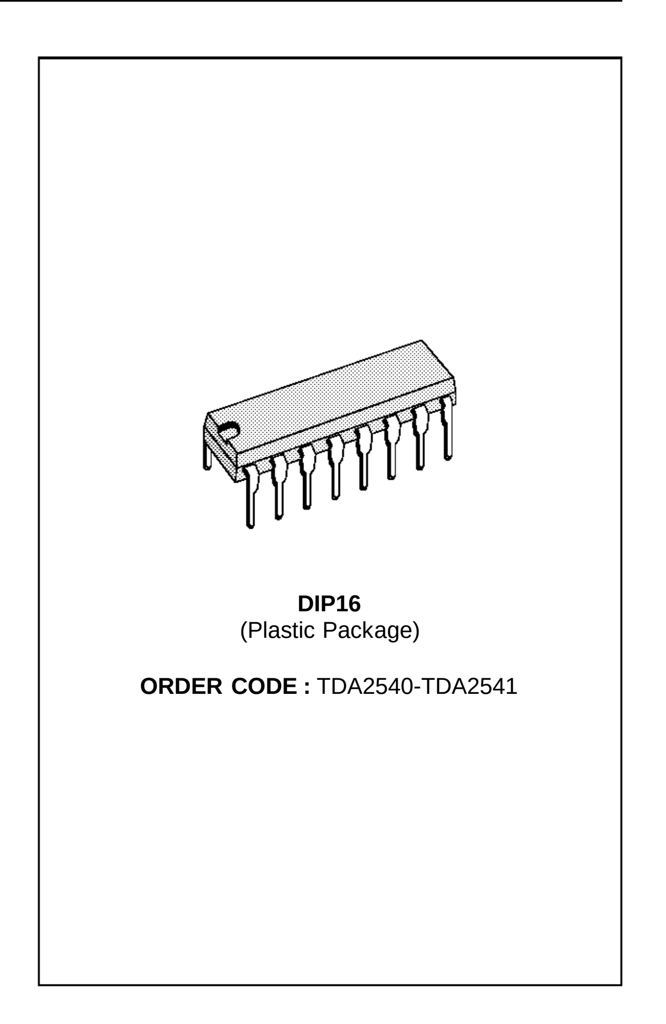
SGS-THOMSON MICROELECTRONICS

TDA2540
TDA2541

IF AMPLIFIER WITH DEMODULATOR AND AFC

- SUPPLY VOLTAGE : 12V TYP
- SUPPLY CURRENT : 50mA TYP
- I.F. INPUT VOLTAGE SENSITIVITY AT F = 38.9MHz : 85µV_{RMS} TYP
- VIDEO OUTPUT VOLTAGE (white at 10% of top synchro) : 2.7V_{PP} TYP
- I.F. VOLTAGE GAIN CONTROL RANGE : 64dB TYP
- SIGNAL TO NOISE RATIO AT V_I = 10mV : 58dB TYP
- A.F.C. OUTPUT VOLTAGE SWING FOR Δf = 100kHz : 10V TYP



DIP16
(Plastic Package)

ORDER CODE : TDA2540-TDA2541

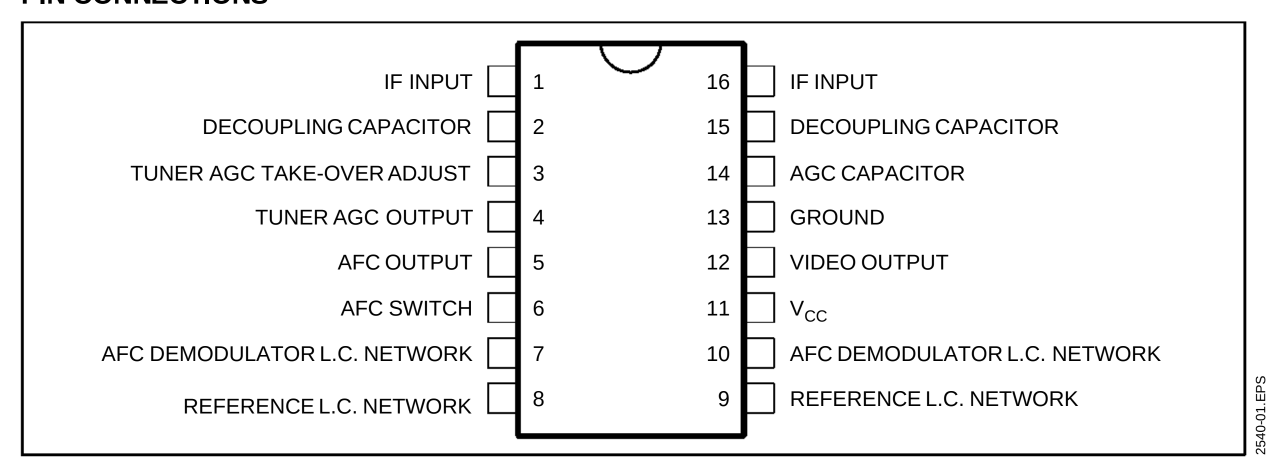
DESCRIPTION

The TDA2540 and 2541 are IF amplifier and A.M. demodulator circuits for colour and black and white television receivers using PNP or NPN tuners. They are intended for reception of negative or positive modulation CCIR standard.

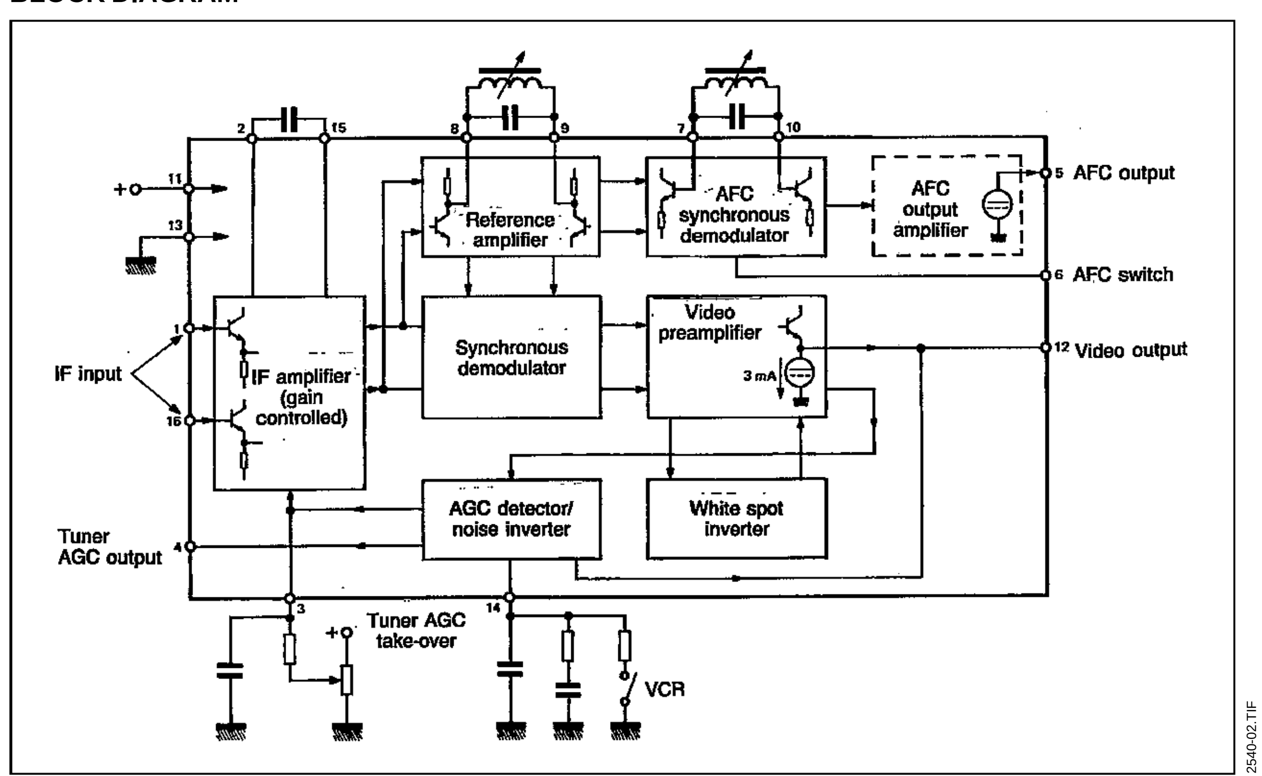
They incorporate the following functions :

- Gain controlled amplifier
- Synchronous demodulator
- White spot inverter
- Video preamplifier with noise protection
- Switchable AFC
- AGC with noise gating
- Tuner AGC output (NPN tuner for 2540)-(PNP tuner for 2541)
- VCR switch for video output inhibition (VCR play back)

PIN CONNECTIONS



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V (11–13)	Supply Voltage	13.8	V
V (4–13)	Tuner A.G.C. Voltage	12	V
P_{tot}	Power Dissipation	900	mW
T_{stg}	Storage Temperature	– 55 to + 125	°C
T_{amb}	Operating Ambient Temperature	0 to + 70	°C

2540-01.TBL

THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th\ (j\text{-}a)}$	Junction - ambient Thermal Resistance	70	°C/W

2540-02.TBL

ELECTRICAL OPERATING CHARACTERISTICS

T_{amb} = 25°C ; V_{11-13} = 12V; f = 38.9MHz (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{11\text{-}13}$	Supply Voltage Range	10.2	12	13.8	V
I_{11}	Supply Current		50	60	mA
$V_{1\text{-}16}$	IF Input Voltage Sensitivity	60	85	180	μV_{RMS}
	Max Input Voltage (Pins 1-16)		140		mV
$V_{12\text{-}13}$	Video Output Voltage		2.7		V_{pp}
$Z_{1\text{-}16}$	Differential Input Impedance (in parallel with 2pF)		2		kΩ
$V_{12\text{-}13}$	Zero Signal Output Level	5.7	6	6.3	V
$V_{12\text{-}13}$	Top Synchro Output Level	2.9	3.07	3.2	V
ΔG_V	IF Voltage Gain Control Range	52	64		dB

2540-03.TBL

ELECTRICAL OPERATING CHARACTERISTICS (continued)

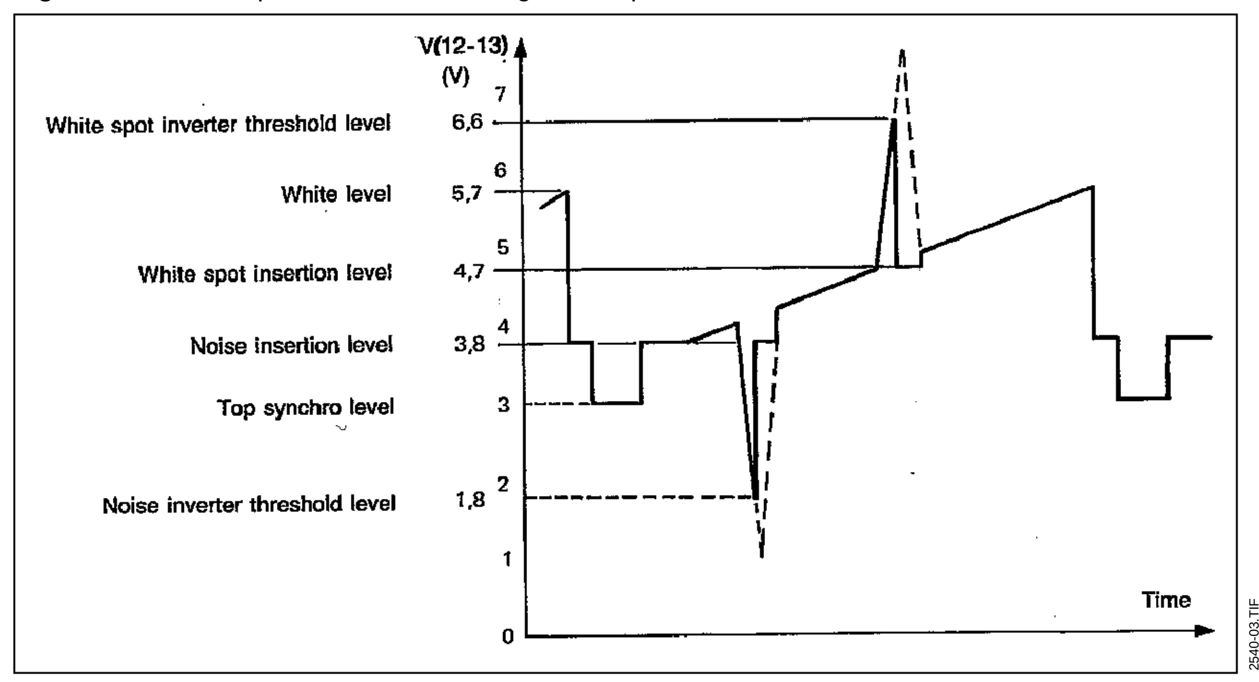
T_{amb} = 25 °C; V (11 – 13) = 12 V; f = 38.9 MHz (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
S/N	Signal to Noise Ratio (V_I = 10mV) (see note 1)	50	58		dB
B	Bandwidth of Video Amplifier (– 3dB)		6		MHz
dG	Differential Gain		4	10	%
dϕ	Differential Phase		2	10	%
V_{12-13}	Carrier Signal at Video Output (V_I = 10mV)		4	30	mV_{RMS}
V_{12-13}	2nd Harmonic of Carrier at Video Output (V_I = 10mV)		20	30	mV_{RMS}
	Intermodulation at 1.1MHz (blue) (see Figures 2 and 3)	46	60		dB
	Intermodulation at 1.1MHz (yellow) (see Figures 2 and 3)	46	50		dB
	Intermodulation at 3.3MHz (blue) (see Figures 2 and 3)	46	54		dB
V_{14-13}	VCR Switches Off Output at : (VCR = low Level)			1.1	V
	White Spot Inverter Threshold Level (see Figure 1)		6.6		V
	White Spot Insertion Level (see Figure 1)		4.7		V
	Noise Inverter Threshold Level (see Figure 1)		1.8		V
	Noise Insertion Level (see Figure 1)		3.8		V
I_4	Tuner AGC output Current Range		0 to 10		mA
V_{14-13}	Tuner AGC Output Voltage			0.3	V
I_4	Tuner AGC Output Leakage Current TDA2541 V_{14-13} = 11V, V_{4-13} = 12V TDA2540 V_{14-13} = 5V, V_{4-13} = 12V			15	µA
ΔV_{5-13}	AFC Output Voltage Swing (Δf = 100 kHz)	10	11		V
Δf	Change of Frequency at AFC Output (voltage swing of 10V)		100	200	kHz
V_{6-13}	AFC Switches OFF (AFC = low level) at :			2.5	V
V_{6-13}	AFC Switches LOW (AFC = High level) at :	3.2			V
V_{5-13}	AFC Zero = Signal Output Voltage (minimum gain)	4	6	8	V

2540-04.TBL

Note : 1. $\frac{S}{N} = \frac{V_O \text{ (black to white)}}{V_N \cdot \text{(RMS at B = 5MHz)}}$ (dB)

Figure 1 : Video Output Waveform Showing White Spot and Noise Inverter Threshold Levels



2540-03.TIF

Figure 2 : Input Conditions for Intermodulation Measurements

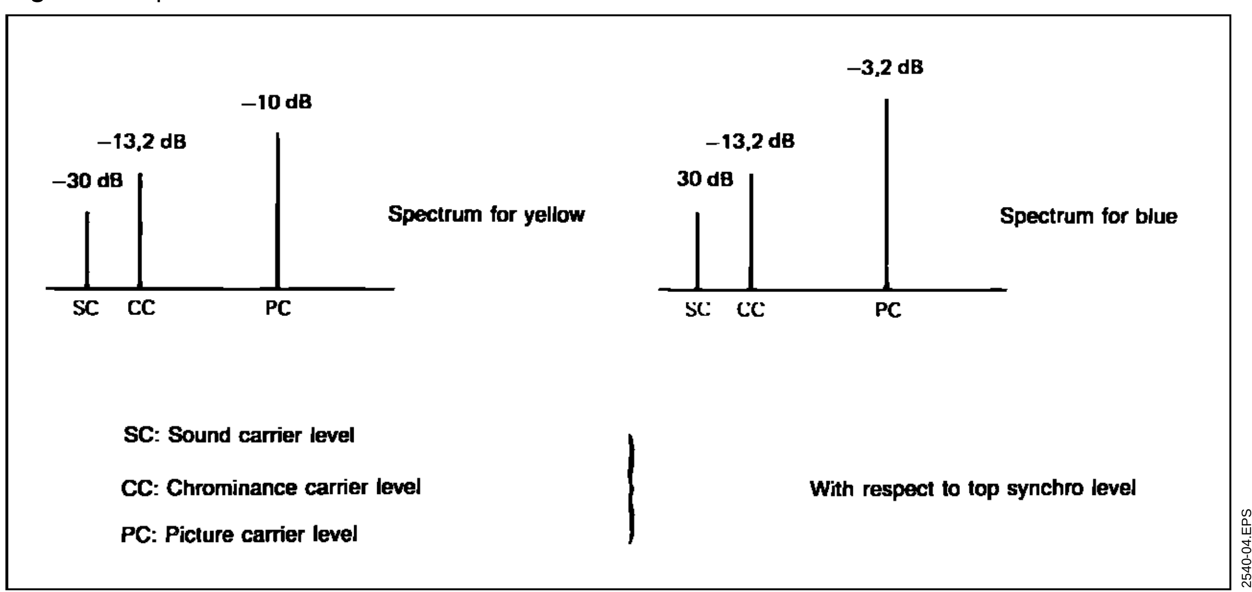
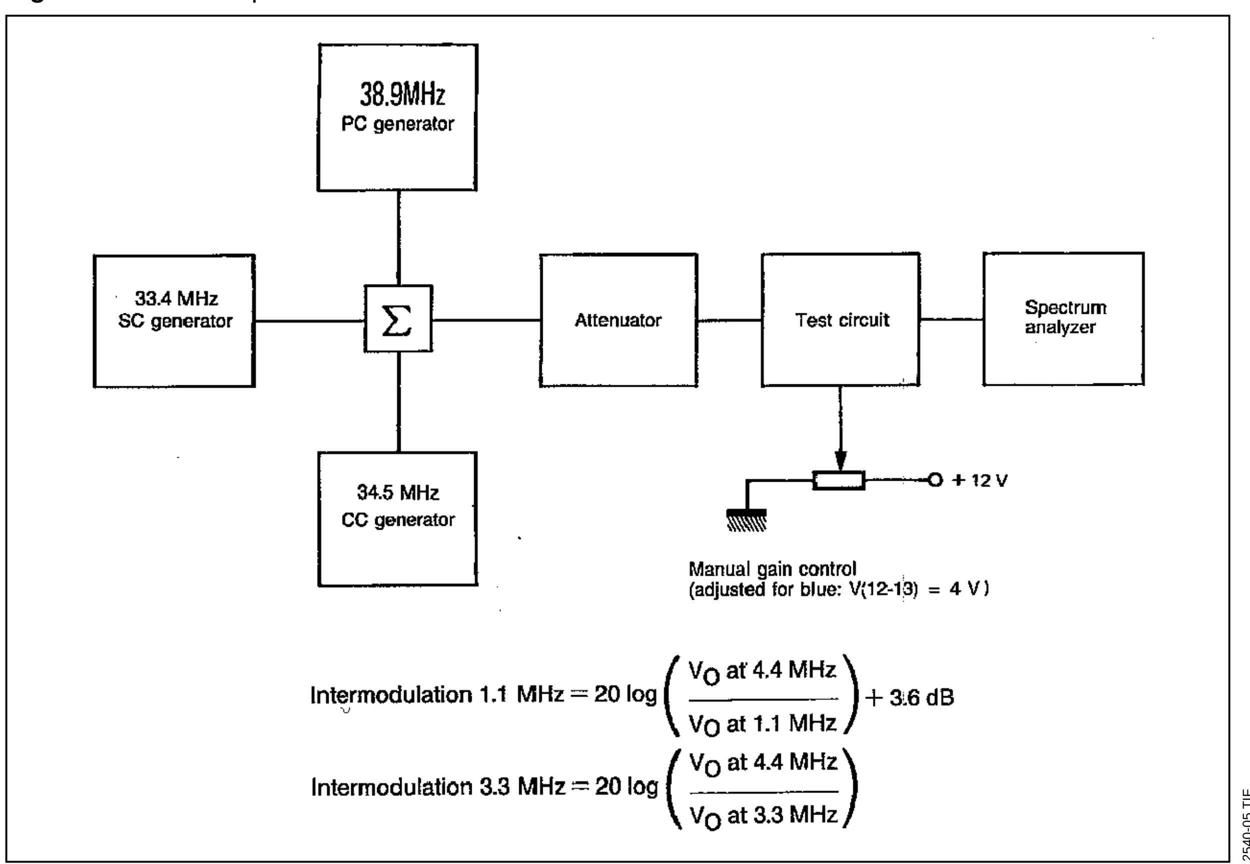


Figure 3 : Test Set-up for Intermodulation



$$\text{Intermodulation 1.1 MHz} = 20 \log \left(\frac{V_O \text{ at } 4.4 \text{ MHz}}{V_O \text{ at } 1.1 \text{ MHz}} \right) + 3.6 \text{ dB}$$

$$\text{Intermodulation 3.3 MHz} = 20 \log \left(\frac{V_O \text{ at } 4.4 \text{ MHz}}{V_O \text{ at } 3.3 \text{ MHz}} \right)$$

Figure 4 : AFC Voltage versus Frequency $V_{5\text{-}13}$

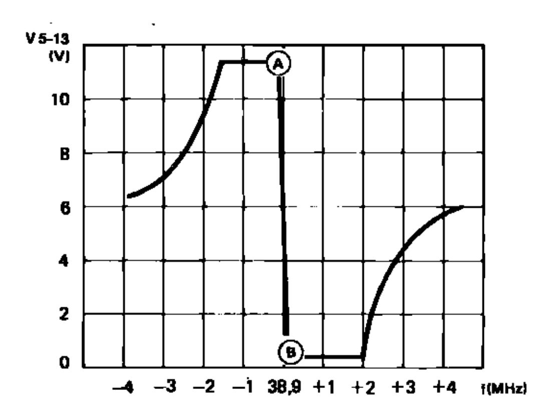


Fig. 4 — AFC VOLTAGE VERSUS FREQUENCY V 5-13

Figure 5 : AFC Voltage versus Frequency $V_{5\text{-}13}$

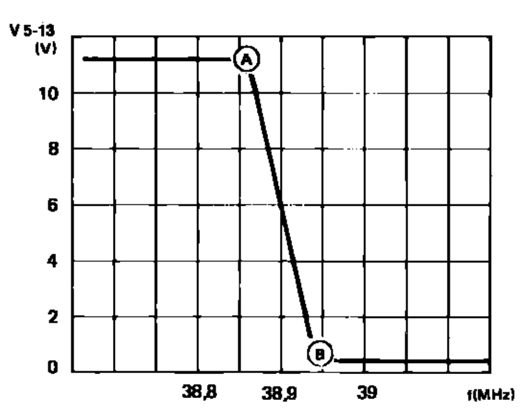


Fig. 5 — AFC VOLTAGE VERSUS FREQUENCY V 5-13

Figure 6 : Signal/Noise Ratio versus Input Voltage $V_{1\text{-}16}$

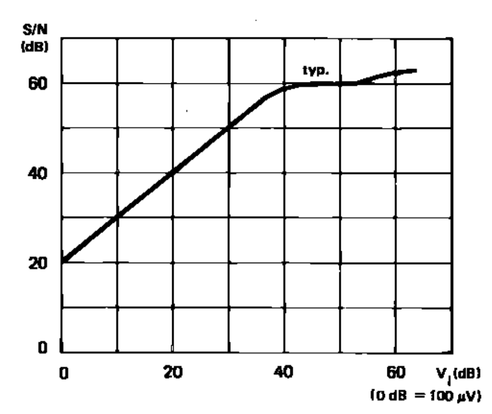
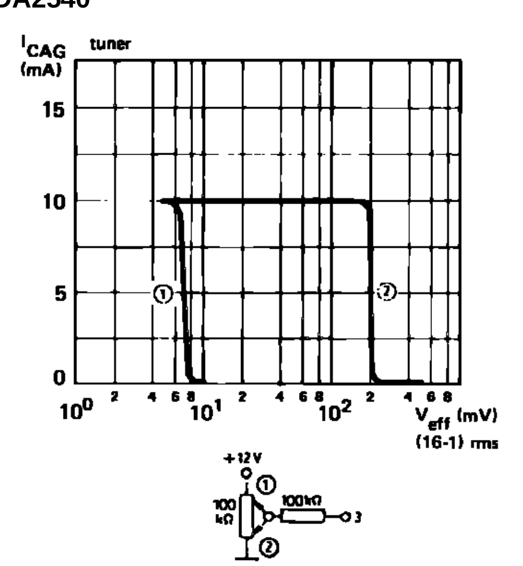


Fig. 6 — SIGNAL/NOISE RATIO VERSUS INPUT VOLTAGE V 1-16

Figure 7 : AGC Tuner Current Curve

TDA2540



TDA2541

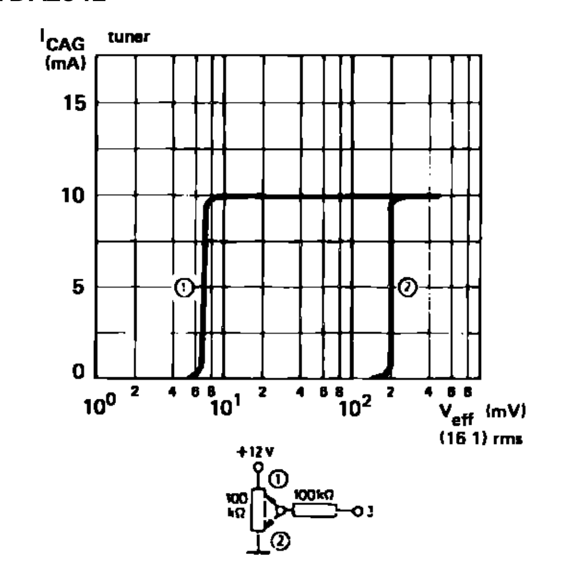
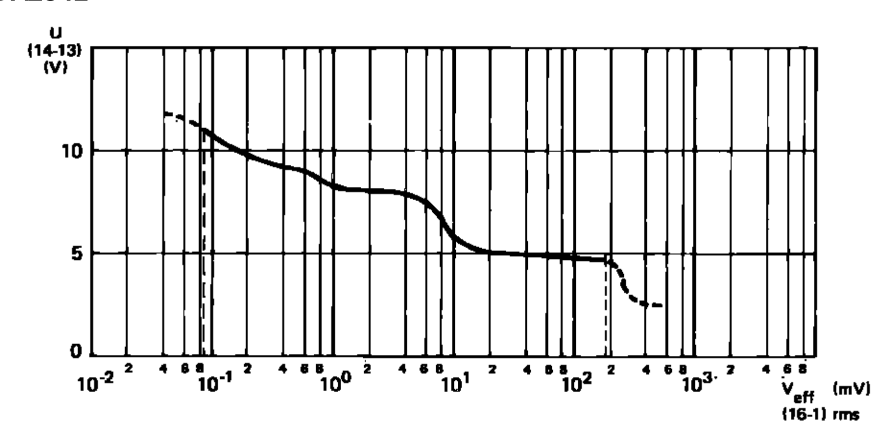
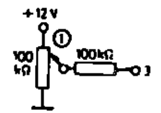


Figure 7 : AGC Tuner Current Curve (continued)

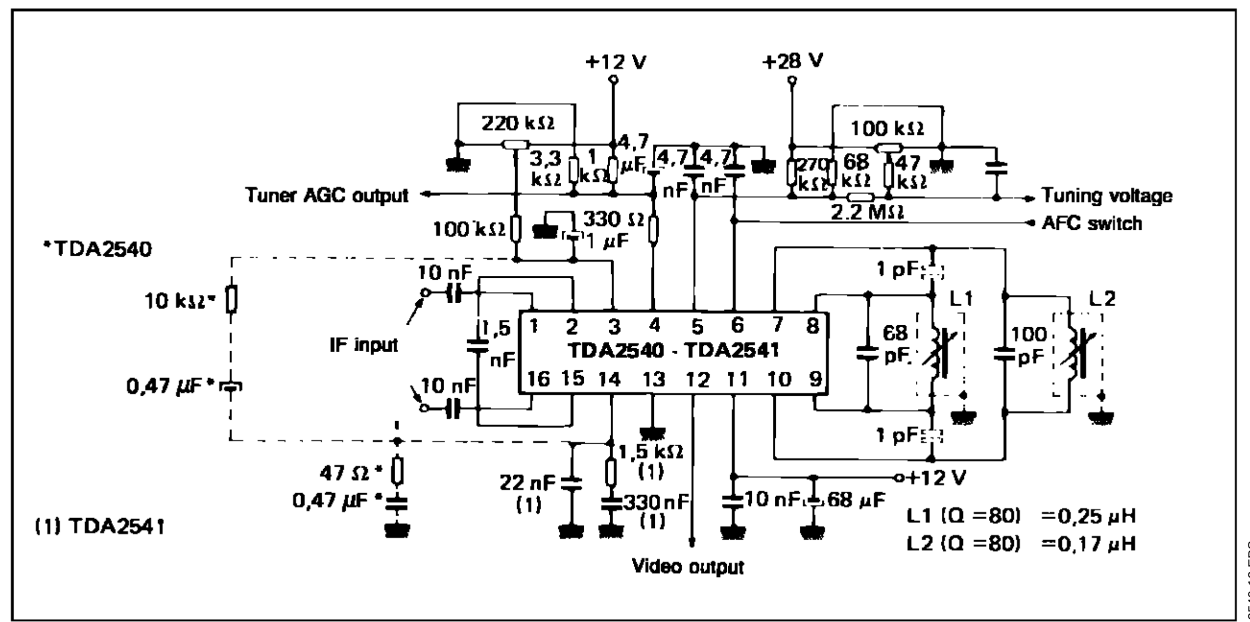
TDA2540 - TDA2541





2540-11.EPS

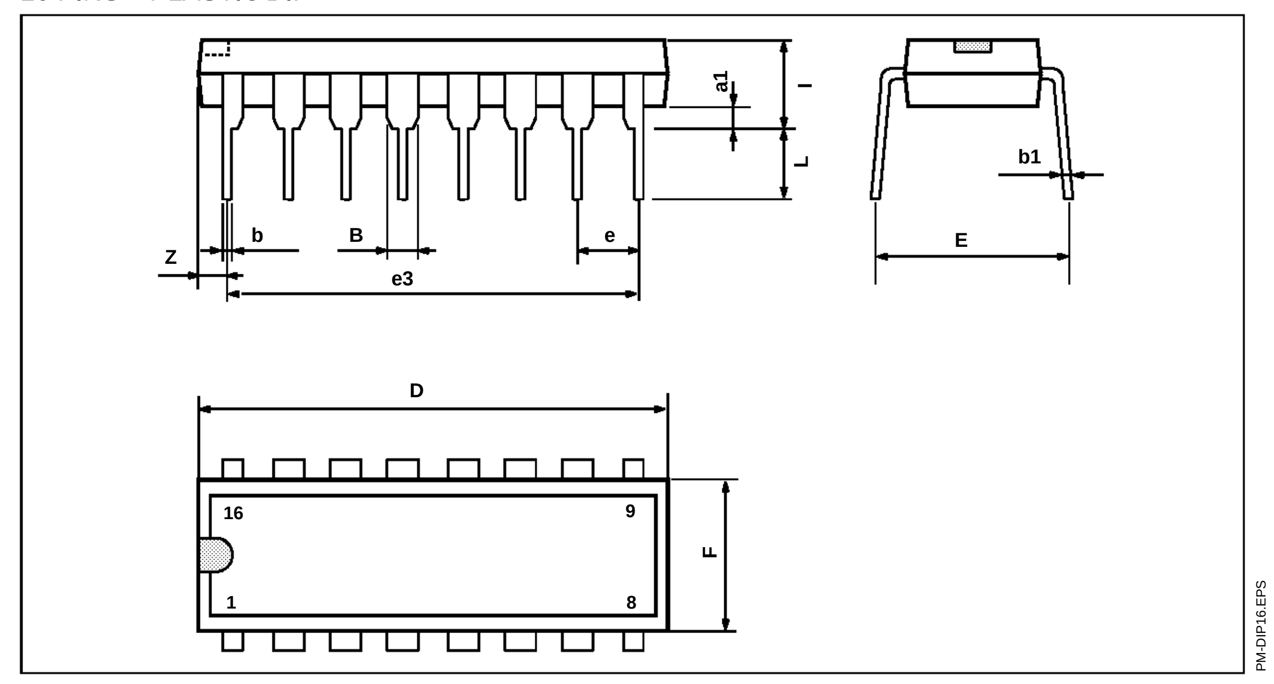
APPLICATION CIRCUIT



2540-12.EPS

PACKAGE MECHANICAL DATA

16 PINS – PLASTIC DIP



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
i			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050

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